



The PIKfyve-ArPIKfyve complex assembles on PtdIns3P-enriched early endosome membranes and catalyzes PtdIns3-to-PtdIns(3,5)P₂ conversion. This switch triggers formation/detachment or maturation of transport intermediates from early endosomes and likely decreases the rate of endosome fusion due to consumption of PtdIns3P and acquisition of PtdIns(3,5)P₂. PIKfyve-ArPIKfyve complex then recruits Sac3 which turns over PtdIns(3,5)P₂ to PtdIns3P, allowing normal membrane fusion may occur. The described events may occur on other PtdIns3P-containing endosomal structures (*i.e.*, ECV/MVB or late endosomes). Impaired endosome plasticity controlled by the PIKfyve-ArPIKfyve-Sac3 complex affects exit from early/post-early endosomal structures to other destinations (purple line), evidenced by impaired post-early endosomal traffic of solutes and endosome-to-TGN membrane transport. ECV/MVB, endosomal carrier vesicles/multivesicular bodies.